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(54) SCREEN PRINTING PLATE AND PRODUCTION THEREOF

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a screen printing plate enabling digital plate making, not requiring a developing process and capable of printing many printed matters of high quality.

SOLUTION: A screen printing plate is constituted by providing an ink infiltrated sealing part on a screen printing plate material layer 20 having a porous or granular form in a predetermined plate pattern and produced by a process forming the predetermined plate pattern on the screen printing plate material layer 20 having the porous or granular form and a process fixing the plate pattern.



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CLAIMS

[Claim(s)]

[Claim 1] The mimeograph printing version characterized by having the filling part which made ink permeate the mimeograph printing version ingredient layer equipped with porosity or a particle-like gestalt by the predetermined version pattern.

[Claim 2] The manufacture approach of the mimeograph printing version which includes the process which forms a predetermined version pattern, and the process to which the version pattern concerned is fixed in the mimeograph printing version ingredient layer equipped with porosity or a particle-like gestalt.

[Claim 3] It is the manufacture approach of the mimeograph printing version according to claim 2 which the process which forms said version pattern makes the ink for ink jets come to permeate into the mimeograph printing version ingredient layer, and the ink for ink jets concerned once carries out heating fusion of the thermofusion nature matter which consists of the thermofusion nature matter or hyperviscous liquid with which it consists of a solid-state, and is injected as a hypoviscosity liquid.

[Claim 4] The manufacture approach of the mimeograph printing version according to claim 2 performed by imprinting the ingredient with which it is liquefied at predetermined temperature and the process in which said version pattern is made to form discovers a fluidity.

[Claim 5] The manufacture approach of the mimeograph printing version according to claim 2 to 4 which the process to which said version pattern is fixed comes to heat-treat under version pattern formation or to version pattern formation Ushiro.

[Claim 6] The process to which said version pattern is fixed is the manufacture approach of light or the mimeograph printing version according to claim 2 to 4 which comes to carry out electron beam irradiation after heat-treatment.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the mimeograph printing version which may have a predetermined pattern drawn, and its manufacture approach by using an ink jet method or a hot printing method.

[0002]

[Description of the Prior Art] In recent years, generally the thermal recording using the heater element as the output, such as a thermal-ink-transfer-printing method and a toner method, is widely known with the spread of a word processor, personal computers, etc. moreover — many — when obtaining the output of several sheets, the DTP (desktop publishing) system which draws up a printing manuscript (block copy) by carrying out document edit with a word processor, a personal computer, etc. progresses, and the laser beam printer etc. is widely used for the output.

[0003] Moreover, the system which can perform inside office the printed matter used in office, a publication, etc. from manuscript creation to printing is being established by using a thermosensitive mimeograph printing system as a method which can be printed simple, without creating the block copy.

[0004]

[Problem(s) to be Solved by the Invention] however, the printer by thermal recording — the same output — many — since the consumption of an expensive ink ribbon or a toner becomes large and it requires great cost and great long duration when you need several sheets, it is hard to call it a desirable printing system.

[0005] Moreover, the block copy is created using a DTP system office, within an education engine, etc., and it is hard to be referred to as not necessarily slight in respect of cost and time amount by dozens of sheets to about thousands of printing number of sheets which extensive printing of tens of thousands of or more sheets requires most at in-house printing, a throwaway, a villa, etc. although cost is slight when outsourcing and printing, such as ** offset printing.

[0006] Moreover, it cannot be said to be a desirable gestalt, when purchasing a lithographic plate machine, a printing machine, etc., printing in the company etc. and the cost at the time of taking into consideration equipment installation costs, an installation tooth space, etc. and the complicatedness of operating are taken into consideration, although there is a merit in respect of a running cost.

[0007] Moreover, although the thermosensitive mimeograph printer of printed one apparatus which carries out a lithographic plate direct is appearing and spreading without using the block copy, the present condition is neither the simplicity nor the thing completely satisfied in respect of printing quality, such as printing image quality, and a strike-through, a set-off, although welcomed in respect of a low running cost.

[0008] This invention is originated by the basis of such the actual condition, and the purpose is in offering the mimeograph printing version [digital platemaking is possible and] which a development process is not needed but can moreover print several many printed matter of high quality, and its manufacture approach.

[0009]

[Means for Solving the Problem] In order to solve such a technical problem, the mimeograph printing version of this invention is constituted so that it may have the filling part which made ink permeate the mimeograph printing version ingredient layer equipped with porosity or a particle-like gestalt by the predetermined version pattern.

[0010] Moreover, the manufacture approach of the mimeograph printing version of this invention is constituted so that the process which forms a predetermined version pattern, and the process to which the version pattern concerned is fixed may be included in the mimeograph printing version ingredient layer equipped with porosity or a particle-like gestalt.

[0011] Moreover, the process which forms a version pattern makes the ink for ink jets come to permeate into the mimeograph printing version ingredient layer as a suitable mode of this invention, and the ink for ink jets concerned is performed so that heating fusion of the thermofusion nature matter which consists of the thermofusion nature matter or hyperviscous liquid which consists of a solid-state may once be carried out and it may be injected as a hypoviscosity liquid.

[0012] Moreover, the process in which a version pattern is made to form is performed as a suitable mode of this invention by imprinting the ingredient which is liquefied at predetermined temperature and discovers a fluidity.

[0013] Moreover, as a suitable mode of this invention, the process to which a version pattern is fixed is constituted so that it may heat-treat and become under version pattern formation or version pattern formation Ushiro.

[0014] moreover, the process to which a version pattern is fixed as a suitable mode of this invention — after heat-

treatment — light — or electron beam irradiation is carried out, and it is constituted so that it may become.

[0015] According to such this invention, the ink pattern formed in the mimeograph printing version ingredient layer using the so-called ink jet method or the hot printing method is solidified at the same time the ink which constitutes the very thing causes the fall of viscosity with heating, and is incorporated in the opening in the mimeograph printing version ingredient layer and it is cooled. Therefore, since it does not become the configuration which the imprint section which is looked at by the version which imprinted the conventional wax and thermoplastics projected but becomes the configuration almost unified by the plane, it is hard to be generated, and the printing version excellent in print durability is obtained, and exfoliation of the imprint section under printing by the lack of a mechanical strength, tailing, etc. do not have a problem of the loss of the material of construction, and can aim at reduction of cost.

[0016]

[Embodiment of the Invention] First, the charge of a mimeograph printing plate used for manufacture of the mimeograph printing version of this invention is explained.

[0017] The charge of a mimeograph printing plate consists of mimeograph printing version ingredient layers 20 equipped with porosity or a particle-like gestalt as shown in drawing 1. What is necessary is just to take the following means, in order to constitute the mimeograph printing version ingredient layer 20 in porosity or a particle-like gestalt, namely, ** — at least, inorganic and/or organic a particle and binder resin are made to contain as a principal component, the mimeograph printing version ingredient layer 20 is constituted, or a front face constitutes the mimeograph printing version ingredient layer 20 by using the resin of ** porosity as a principal component.

[0018] As an inorganic particle contained in the mimeograph printing version ingredient layer 20, a zeolite, alumina sol, titanium oxide, a zinc oxide, clay, silicon soil, a magnesium carbonate, magnesium sulfate, talc, a barium sulfate, a calcium carbonate, colloidal silica, a zinc sulfate, a magnesium hydroxide, a calcium oxide, magnesium oxide, a clay silicate, milt balun, a lithopone, a barium carbonate, a metallic oxide, a metal powder, etc. are raised. 0.01–30–micrometer colloidal silica, alumina sol, titanium oxide, and a zinc oxide are suitable for especially this invention the mean particle diameter of 30 micrometers or less also especially in these. If un-arranging [that the resolution as a printing version will decline and will become inadequate / the quality of the printed matter obtained / if this mean particle diameter exceeds 30 micrometers] arises and this mean particle diameter is set to less than 0.01 micrometers, un-arranging [that osmosis of ink becomes difficult at the time of printing] will arise.

[0019] An organic particle has the particle by which the front face was covered with the inorganic pigment, and a thing without that right. The organic particle covered with the former inorganic pigment can be obtained by impact processing in a coating method (the surface embellishing method), a hetero condensation method, and a high-speed flow.

[0020] The approach of adding water, hydrolyzing and making it put on an organic particle front face is mentioned as an example, and a coating method may cover with an inorganic pigment the organic particle which does not have a functional group by adding the component which otherwise combines the mineral constituent and organic component like a meta-chestnut ROKISHI silane, after making the hydroxyl group and metal alkoxide on the front face of for example, an organic particle react preferentially first.

[0021] If the magnitude of a particle differs from the sign of the surface charge of a particle, after a hetero condensation method will use that the energy of the interaction between different particles differs and will adjust the surface charge of a different particle to forward and negative beforehand, it is an approach which homogeneity is made to condense with electrostatic attraction.

[0022] the approach the impact processing in a high-speed flow makes a large drop child front face fix a granule child (embedding) — it is — more — concrete — the hybridization of the (1) Nara machine factory, the KOSUMO system of (2) Kawasaki Heavy Industries, the mechano fusion of (3) Hosokawa Micron, and (4) Okada — it is carried out using equipments, such as a theta composer of an elaborate mechano mill and (5) **** machining place.

[0023] With the magnitude and the ingredient of an organic particle to be used, although organic particles (that by which the front face is not covered with an inorganic pigment) differ, generally they can acquire the polymerization method by polymerization methods, such as a distributed polymerization as shown below, a soap free emulsion polymerization, an emulsion polymerization, a seed polymerization, a micro gel polymerization, or a reversed micelle polymerization, and emulsification distribution.

[0024] A distributed polymerization is a polymerization method which generates a particle by the polymerization under amphiphilic polymer existence as a dispersant.

[0025] A soap free emulsion polymerization is the polymerization method an ionicity polymerization initiator and the oligomer which has surface activity by the water solubility formed from a monomer offer a polymerization place and distributed stability, and does not use an emulsifier.

[0026] An emulsion polymerization is a kind of heterogeneous polymerization, it is the polymerization method which creates the dispersion liquid of a polymer particle by making the emulsion of a monomer into a start system, and a typical emulsion-polymerization system consists of a monomer, an emulsifier, a water-soluble polymerization initiator, and water. It is the polymerization method a micro gel polymerization and a reversed micelle polymerization also use an emulsifier.

[0027] A seed polymerization consists of a nucleation process and a growth process by the approach of performing by bisecting the generation process of a particle. A nucleation process is the approach of it being completely the same as an emulsion-polymerization process, using for a seed particle the particle generated in the nucleation process in the growth process, maintaining emulsifier concentration below at critical micelle concentration, and

performing a polymerization.

[0028] Emulsification distribution is a variational method which obtains a particle by dissolving a macromolecule insoluble in water in an organic solvent, carrying out emulsification distribution of this using a macromolecule dispersant, and removing a solvent.

[0029] An inorganic particle which has been mentioned above, an organic particle, the organic particle with which the front face is covered by inorganic are bound with the binder resin contained in the mimeograph printing version ingredient layer 20, consequently the porosity or the particle-like gestalt of the mimeograph printing version ingredient layer 20 is formed. In addition, 40 – 95wt%, especially 60 – 90wt% of the content in the mimeograph printing version ingredient layer 20 of the above-mentioned particle is desirable.

[0030] As binder resin, a water-soluble thing is used to water.

[0031] The butyral resin with which the hydroxyl group more specifically remains, starch and its denaturation object, Denaturation objects, such as PVA (polyvinyl alcohol) and the aceto acetyl compound, An SBR latex, an NBR latex, a hydroxy cellulose, a polyvinyl pyrrolidone, Casein, methyl cellulose, hydroxyethyl cellulose, a carboxymethyl cellulose, Sodium polyacrylate, sodium alginate, gum Arabic, the alkali saponification object of cellulose acetate, What carried out melamine bridge formation of the water soluble resin, such as an ethylene-vinylalcohol copolymer and casein, The acrylic (meta) copolymer containing a hydrophilic monomer, a hydrophilic binder given in JP,59-174394,B, a styrene maleic-anhydride copolymer, a methyl-vinyl-ether maleic-anhydride copolymer, etc. are raised.

[0032] A deck-watertight-luminaire-ized agent is used together to such binder resin. The deck-watertight-luminaire-ized agent used together has cross linking agents, such as the initial condensate of melamine formaldehyde, formaldehyde resin, denaturation polyamide formaldehyde resins, melamine resin, a urea-resin, polyamide resin, carbonic acid zirconium ammonium, a potassium pyroantimonate, an aluminum sulfate, an organic titanium chelate, and glyoxal.

[0033] As hydrophilic resin used in order to form porosity, what is used for the above-mentioned binder resin can be used. In forming hydrophilic resin in porosity, even if it uses together said inorganic thru/or organic particle

[0034] Polymeric materials are made to distribute the impalpable powder of (1) fusibility matter as an approach of obtaining the porous body of hydrophilic resin. How to make carry out elution of the fusibility matter with a suitable solvent, and use as a porous body, after polymeric materials gel, (2) How to mix the polymeric materials which cause SUPINODARU decomposition, make carry out elution of the fusibility matter with a suitable solvent after decomposition, and use as a porous body, (3) How to make it foam below with the decomposition temperature of a foaming agent first using a foaming agent with decomposition temperature higher than the melting point of resin, (4) Addition mixing of the evaporation mold solvent is carried out in resin or the raw material phase at the time of resin composition, and the approach of carrying out the mind scattering bubble of the solvent using heating or the heat of reaction at the time of resin composition etc. is mentioned.

[0035] As for the mimeograph printing version ingredient layer 20 containing a constituent, it is desirable more preferably like the above to have a 1-25-micrometer opening the pitch diameter of 0.3-30 micrometers. If un-arranging [that the resolution as a printing version will decline and will become inadequate / the quality of the printed matter obtained / if this value exceeds 30 micrometers] arises and this value is set to less than 0.3 micrometers, un-arranging [that osmosis of ink becomes difficult at the time of printing] will arise.

[0036] Thickness of such a mimeograph printing version ingredient layer 20 is usually set to about 5-200 micrometers.

[0037] Towards such a mimeograph printing version ingredient layer 20, the ink for ink jets is injected by the predetermined version pattern with an ink jet method, or hot printing of the imprint ingredient is carried out to a predetermined version pattern by the hot printing method, and the mimeograph printing version is formed.

[0038] The case where a predetermined version pattern is first produced with an ink jet method is explained.

[0039] In this case, the ink for ink jets (an "ink ingredient" is only called hereafter) used is ordinary temperature, is thermofusion nature matter which consists of the thermofusion nature matter or hyperviscous liquid which consists of a solid-state, carries out heating fusion and is once injected as a hypoviscosity liquid. That is, predetermined temperature and the binder as thermofusion nature matter suitably softened or fused easily at 35-180 degrees C are included.

[0040] As such a binder (thermofusion nature matter), the well-known thing used as thermofusion nature ink for ink jets can be used conventionally. For example, thermoplastics, natural resin, a wax, rubber, a higher fatty acid, fatty alcohol, the fatty acid ester containing higher-fatty-acid ester, amides, lactone, lactams, aromatic alcohol, ether, etc. are used.

[0041] More specifically For example, spermaceti wax, carnauba wax, a candelilla wax, Natural waxes, such as haze wax, yellow bees wax, a montan wax, and lanolin, Paraffin wax, a micro crystallin wax, ester wax, Synthetic waxes, such as an oxidization wax, low-molecular-weight polyethylene wax, and chloroparaffin, A lauric acid, a myristic acid, a palmitic acid, stearin acid, a FUROMEN acid, Fatty-acid alcohols, such as higher fatty acids, such as behenic acid, stearyl alcohol, and BEHENIN alcohol, Fatty acid ester, such as fatty acid ester of cane sugar, and fatty acid ester of SURUBITAN Amides, such as a stearin amide and an olein amide, lactone, and lactams Aromatic alcohol, ether, a polyvinyl chloride, a polyvinylidene chloride, Vinyl system resin, such as polystyrene and polyvinyl acetate, a vinyl chloride-polyvinyl acetate copolymer, An ethylene-acrylic-acid copolymer, an ethylene-methacrylic-acid copolymer, An ethylene-vinylacetate copolymer, styrene-Butadiene Acrylonitrile, Copolymers, such as an ethylene-alpha olefin copolymer elastomer and an ethylene-vinylacetate copolymer saponification object, Cellulose system resin, such as ethyl cellulose and cellulose acetate, polyethylene, Polypropylene, acid denaturation polyolefine, polystyrene, a

polyvinyl butyral, A polyacrylonitrile, a polyamide, a polycarbonate, polysulfone, Polyacetal, polymethylmethacrylate, polyphenylene oxide, Thermoplastics, such as polyurethane, polyethylene terephthalate, and polybutadiene terephthalate, Synthetic rubber, chlorinated rubber, natural rubber, other epoxy system resin, polyurethane system resin, There are acrylic resin, petroleum system resin, phenol system resin, a polyethylene system wax, a montan wax, a Fischer Tropsch wax, an oil system wax, etc., and these matter may be mixed suitably. Such a binder is usually contained at an about [10-70wt%] rate in an ink ingredient.

[0042] It is desirable to contain a hardenability constituent (a hardenability monomer or oligomer), i.e., the hardening component hardened with an energy line, in such an ink ingredient. An energy line means an electron ray, ultraviolet rays, a heat ray, etc. As a hardenability component hardened with an energy line, although a hardenability monomer or oligomer is used, the hardening ingredient which has the property still more specifically hardened with light (ultraviolet rays) or an electron ray, and the thermosetting ingredient which has the property hardened with heat can be used.

[0043] As light or an electron ray hardenability constituent, all well-known light and electron ray ingredients can use it. for example, the photolysis bridge formation which consists of negative-mold diazo resin and resin which has the functional group which can construct a bridge by the photolyte of an azide compound and an azide compound — a sexual feeling — optical material, a cinnamic acid mold photopolymer, light, an electron ray polymerization nature constituent, etc. are mentioned.

[0044] In this, especially desirable things are light and an electron ray polymerization constituent. Such light and an electron ray polymerization nature constituent are usually contained at an about [30-90wt%] rate in an ink ingredient.

[0045] As an example of light and an electron ray polymerization nature constituent, it is the constituent of the light and the electron ray polymerization nature monomer or oligomer which carries out a polymerization with light, such as ultraviolet rays, and a photopolymerization initiator. Here, when using the polymerization nature monomer and oligomer which carry out a polymerization with an electron ray, there may not be a photopolymerization initiator.

[0046] As light and an electron ray polymerization nature monomer, or oligomer The ester acrylate which introduced an acrylic acid or methacrylic acid into the ester obtained by association of polybasic acid and dihydric alcohol, The ether acrylate which introduced an acrylic acid or methacrylic acid into the ether obtained by association of alkylene oxide and polyhydric alcohol, The epoxy acrylate which introduced an acrylic acid or methacrylic acid into the epoxy resin, Urethane acrylate, amino resin acrylate with a urethane bond, The resultant of acrylic resin acrylate, alkyd-resin acrylate, spirane resin acrylate, silicone resin acrylate, unsaturated polyester, and said light and electron ray polymerization nature monomer, the resultant of waxes and said polymerization nature monomer, etc. are used.

[0047] Moreover, as a photopolymerization initiator of a radical polymerization, aromatic ketone, a peroxide, iodonium salt, alkyl way acid chloride, an iron-arene complex, bis-imidazole derivatives, titanocene, and other initiators are used. Moreover, since it combines with the oxygen molecule in atmospheric air and reactivity worsens, a generation radical has that desirable by which the structure of the 3rd class alkylamine, a polyether, and an allyl group was introduced into said light and electron ray polymerization nature monomer. As a photopolymerization initiator of cationic polymerization, diazonium salt, a diaryl iodonium salt, a triarylsulfonium salt, a thoria reel seleno NIUMU salt, a silanol / aluminum complex, a sulfonate, and imide sulfonate are used. In addition to this as a component of light and an electron ray polymerization nature constituent, a reactant diluent, a chain transfer agent, thermal polymerization inhibitor, etc. are used if needed.

[0048] As a thermosetting ingredient, it can be used in the combination of a well-known resin and a well-known cross linking agent. Specifically, melamine resin, hydroxyl-group content polymer / melamine resin, epoxy resin / resol mold resin, epoxy resin / amines, epoxy resin/carboxylic acid or acid-anhydride, and epoxy compound/etc. is used.

[0049] A thermosetting ingredient, and light and an electron ray polymerization nature ingredient may be used together.

[0050] As a component of the thermofusion matter of the binder under above "an ink ingredient", as mentioned above (it is a substitute to a solid thing), the thermofusion matter of a hyperviscous liquid condition may be used. The reason for using the thermofusion matter in the state of a hyperviscous liquid is effective in order for there to be some thermofusion matter from which decomposition begins near the melting temperature and to hypoviscosity-ize in a suitable temperature requirement. However, it is difficult for the rate of the thermofusion matter to decrease the amount of solvents in increase and the hypoviscosity-ized ink, and to obtain the required engine performance as a printing version in the ink of the specified quantity. In this case, matter, such as polyhydric alcohol, such as alcohols, such as the organic solvent of a liquid, for example, 1-hexanol, 1-heptanol, and 1-octanol, ethylene glycol, propylene glycol, and triethylene glycol, other glycol ester, ketones, keto alcohol, amides, ether, and ester, may be made to contain in ordinary temperature. However, the addition of said organic solvent needs to consider as 1 - 30 % of the weight to the thermofusion matter so that the thermofusion matter can maintain a hyperviscous liquid condition.

[0051] As a component of an "ink ingredient", in order to raise the visibility of various additives, such as an antioxidant and a dispersant, and the imprinted pattern above else, there is thermal resistance by color material which is indicated by the Color Index, and if hardenability is not checked, it can be used. Generally direct dye, acid dye, reactive dye, a pigment, etc. can use it preferably. As an example, permanent carmine, Phthalocyanine Green, a copper phthalocyanine blue, carbon black, etc. are mentioned.

[0052] Subsequently, the case where a predetermined version pattern is produced with a hot printing method is

explained.

[0053] The ingredient which the ingredient imprinted is liquefied at predetermined temperature and discovers a fluidity is used. Although the above-mentioned "ink ingredient" and the same ingredient are specifically used, in the case of hot printing, that by which the above-mentioned ink ingredient was applied on the base material is used as a medium for an imprint.

[0054] Transparency plastic film, cellophane, thin paper, etc. can be made to apply as a base material.

[0055] Also in these, transparent plastic film with especially thin polyester etc. is desirable, and, more specifically, polystyrene, polyethylene terephthalate, polyethylene, polypropylene, a styrene acrylonitrile copolymer, polyvinyl chloride, a polycarbonate, vinylidene chloride, etc. are raised. Thickness of such a base material is usually set to about 3-300 micrometers.

[0056] Moreover, in the ink ingredient of hot printing, endoergic or optical-thermal-conversion ingredient contains further. These ingredients are used so that it may be made to liquefy easily with heat and things can do an ink ingredient.

[0057] As endoergic or an optical-thermal-conversion ingredient, various kinds of pigments, colors, and coloring matter are usually used. As a suitable example, carbon black, activated carbon, a cadmium sulfide, sulfur, zinc sulfide, a sulfo cadmium selenide, the chrome yellow, a molybdate orange, rouge, a copper phthalocyanine blue, a crystal violet, cyanine system coloring matter, IR absorption coloring matter, etc. are raised.

[0058] such endoergic or optical-thermal-conversion ingredient — usually — about 0.1-5wt% — it contains.

[0059] Next, the manufacture approach of the mimeograph printing version using such a charge of a mimeograph printing plate (the mimeograph printing version ingredient layer 20) is explained. The manufacture approach of the mimeograph printing version of this invention is constituted by the mimeograph printing version ingredient layer 20 equipped with porosity or a particle-like gestalt including the process which forms a predetermined version pattern, and the process to which the version pattern concerned is fixed.

[0060] The case of an ink jet method is explained first.

[0061] The ink for ink jets is made first, to inject so that a version pattern may be formed towards the mimeograph printing version ingredient layer 20 (process which forms a version pattern). And it heat-treats under this version pattern formation or to version pattern formation Ushiro (process to which a version pattern is fixed). Heat-treatment conditions are usually performed on condition that extent for the temperature of 70-180 degrees C, and duration 1 to 60 minutes, although it changes also with physical properties of the ink for ink jets to be used. The fall of the viscosity of ink takes place by this heat-treatment, and ink is incorporated by thermofusion diffusion in the opening of the mimeograph printing version ingredient layer 20. Under the present circumstances, it does not become the configuration which the imprint section which is looked at by the version which imprinted the conventional wax and thermoplastics projected, but becomes the configuration almost unified by the plane. Since the mimeograph printing version ingredient layer 20 is making porosity or a particle-like gestalt, thermofusion diffusion into the mimeograph printing version ingredient layer 20 in this case can be performed easily. According to such an operation, a filling operation of the so-called predetermined pattern works, and the part along which printing ink passes at the time of printing, and the part along which it does not pass are made. That is, the mimeograph printing version of this invention has the composition of having the filling part which made ink permeating the mimeograph printing version ingredient layer 20 equipped with porosity or a particle-like gestalt by the predetermined version pattern.

[0062] In addition, as mentioned above, in ordinary temperature, the ink for ink jets once carries out heating fusion of the thermofusion nature matter which consists of the thermofusion nature matter or hyperviscous liquid which consists of a solid-state, and is injected as a hypoviscosity liquid.

[0063] It is a suitable mode to perform light or electron-beam-irradiation processing after such heat-treatment. It is for strengthening the formed version pattern more. In addition, there is especially no limit that what is necessary is to select suitably light or electron-beam-irradiation processing conditions, and just to usually perform them in the conditions currently used.

[0064] Next, the case of a hot printing method is explained, referring to drawing 2.

[0065] In the case of a hot printing method, as shown in drawing 2 (a), the imprint ingredient 60 of the hot printing medium 7 is applied to another base material 50, and is stuck with the front face of the mimeograph printing version ingredient layer 20, and heat or light is added to a predetermined pattern (laser is illustrated when it is drawing). Then, the imprint ingredient 60 carries out softening fusion, into the mimeograph printing version ingredient layer 20, thermofusion diffusion is carried out and the filling part 21 is formed (drawing 2 (b)). In addition, the sign 61 shows the disappearance section of an imprint ingredient.

[0066] Subsequently, it is made to harden by exfoliating a transfer medium 7 (drawing 2 (c)), and making light (especially ultraviolet rays (UV)) or an electron ray irradiate, or heat-treating, and the mimeograph printing version of this invention is obtained (drawing 2 (d)). In addition, the hardening processing by the exposure of light (especially ultraviolet rays (UV)) or an electron ray and the hardening processing by heating may be used together.

[0067] In the mimeograph printing version of this invention, corresponding to a version pattern, said ink for ink jets or (heat) an imprint ingredient carries out melting diffusion, and exists in said mimeograph printing version ingredient layer 20 so that the manufacture approach explained above may also show. This part turns into the so-called filling part of the mimeograph printing version, and does not make printing ink penetrate. Since the part of the remainders other than a filling part is equipped with porosity or a particle-like gestalt from the first, printing ink is penetrated. Printing using the mimeograph printing version is performed based on such a principle.

[0068] In addition, about the ink JITTO method itself used for above-mentioned this invention, there is especially no limit and it can adopt well-known approaches, such as an electric charge control system, an electric-field control system, a pressure pulse method, and an ink Myst method, suitably.

[0069]

[Example] Below the concrete example of this invention is shown and this invention is further explained to it at a detail.

[0070] [Example 1] In order to form the mimeograph printing version ingredient layer 20, the mimeograph printing version ingredient layer constituent 1 as shown below was prepared.

[0071]

The mimeograph printing version ingredient layer constituent 1 Aerosil TT600 (product made from Japanese Aerosil) — Ten weight sections (solid content)

Polyvinyl alcohol 217 (Kuraray Co., Ltd. make) — Two weight sections (solid content)

Cymel (the Mitsui Cyanamid make) — The 0.3 weight sections (solid content)

And about 10% coat liquid of solid content which consists of water was adjusted, on the PET substrate with a thickness of 100 micrometers with which mold release processing of the front face is carried out beforehand, this thing was applied so that the thickness at the time of desiccation might be set to 40 micrometers by the bar coating machine, after that, 100 degrees C and deck-watertight-luminaire-ized processing for 30 minutes were carried out, and the mimeograph printing version ingredient layer 20 was formed. After an appropriate time, the mimeograph printing version ingredient layer 20 and the substrate were exfoliated, and the mimeograph printing version ingredient layer 20 of a simple substance was obtained. In this case, the average opening of the mimeograph printing version ingredient layer 20 was 0.6 micrometers.

[0072] Subsequently, three kinds of ink constituents for ink jets as shown below (the "ink ingredient constituent" was only prepared hereafter.)

[0073]

The ink ingredient constituent 1 Carnauba wax — 85 weight sections Stearin acid — Ten weight sections Ink ingredient constituent 2 Ethylene carbonate (melting point of 39 degrees C) — 45 weight sections 1, 10-Deccan diol — 47 weight sections Methoxy polyethylene-glycol methacrylate — 34 weight sections Ink ingredient constituent 3 Butyl acrylate / ethyl acrylate / methacrylic-acid copolymer (6/2/2) — 45 weight sections Hexamethylene di-isocyanate / m-nitrophenol block isocyanate — 7 weight sections — the version pattern was formed in the above-mentioned mimeograph printing version ingredient layer 20 using such an ink ingredient constituent, and 180 degrees C or less and heat-treatment in less than 30 minutes were performed. Then, about the ink ingredient constituent 2, the printing version was formed by EB exposure, and it used for printing as it is about the ink ingredient constituents 1 and 3. It was checked that the clear printed matter to which there is no wear of the film omission of the non-image section or a printing plate when it prints to 1500 sheets, 3000 sheets, and 2800 sheets, respectively by setting each done mimeograph printing version to a mimeograph printing machine as it is, and each dot size of the image section was equal about the version of the ink ingredient constituents 1, 2, and 3 on the usual printing conditions is obtained.

[0074] [Example 2] In order to form the mimeograph printing version ingredient layer 20, the mimeograph printing version ingredient layer constituent 2 as shown below was prepared.

[0075]

The mimeograph printing version ingredient layer constituent 2 Silica fine particles — The 100 weight sections Polyvinyl alcohol 217 (Kuraray Co., Ltd. make) — 25 weight sections The initial condensate of a melamine-formamide — Six weight sections An organic amine hydrochloride — On the PET substrate with a thickness of 100 micrometers with which mold release processing of the front face is carried out beforehand, the water solution of the 0.7 weight sections above-mentioned constituent was applied so that the thickness at the time of desiccation might be set to 30 micrometers by the bar coating machine, after that, 100 degrees C and 10-minute KYUA were performed, and the water resisting property was given. After an appropriate time, the mimeograph printing version ingredient layer 20 and the substrate were exfoliated, and the mimeograph printing version ingredient layer 20 of a simple substance was obtained. In addition, the path of the primary particle made to contain in the mimeograph printing version ingredient layer 20 was 2 micrometers.

[0076] Subsequently, when the version pattern was formed in the mimeograph printing version ingredient layer 20 and it printed to 2500 sheets in the same way as the above-mentioned example 1 using the ink constituent 1 among three kinds of ink constituents for ink jets used in the above-mentioned example 1, it was checked that the clear printed matter to which there is no wear of the film omission of the non-image section or a printing plate, and each dot size of the image section was equal is obtained.

[0077] [Example 3] In order to form the mimeograph printing version ingredient layer 20, the mimeograph printing version ingredient layer constituent 3 as shown below was prepared.

[0078]

The mimeograph printing version ingredient layer constituent 3 Polyvinyl alcohol 217 (Kuraray Co., Ltd. make) — Five weight sections Water/isopropyl alcohol — The 170 weight sections A styrene monomer — Six weight sections 4', a 4'-azobis-4-cyano valeric acid — The solution which consists of the 0.3 weight sections is stirred at the rate of 150rpm. 70 degrees C, The polymerization was performed for 8 hours, on the PET substrate with a thickness of 100 micrometers with which mold release processing of the front face is carried out beforehand, it applied so that the thickness at the time of desiccation might be set to 40 micrometers by the bar coating machine, and it dried for

10 minutes, deck-watertight-luminaire-ized processing was performed, and the 80 degrees C of the mimeograph printing version ingredient layers 20 were formed. After an appropriate time, the mimeograph printing version ingredient layer 20 and the substrate were exfoliated, and the mimeograph printing version ingredient layer 20 of a simple substance was obtained. The pitch diameter of the particle contained in the mimeograph printing version ingredient layer 20 was 1.8 micrometers.

[0079] Subsequently, when the version pattern was formed in the mimeograph printing version ingredient layer 20 in the same way as the above-mentioned example 1 and the same experiment was conducted using the ink constituent 2 among three kinds of ink constituents for ink jets used in the above-mentioned example 1, it was checked that the clear printed matter to which there is no wear of the film omission of the non-image section or a printing plate, and each dot size of the image section was equal is obtained.

[0080] [Example 4] In order to form the mimeograph printing version ingredient layer 20, the mimeograph printing version ingredient layer constituent 4 as shown below was prepared.

[0081]

The mimeograph printing version ingredient layer constituent 4 Polyvinyl alcohol 217 (Kuraray Co., Ltd. make) — Seven weight sections Aerosil 200 (product made from Japanese Aerosil) — Four weight sections A glyoxal (40% article) — The coat liquid of about 10% of solid content which consists of the 15 weight sections and water is adjusted. On a PET substrate with a thickness of 100 micrometers by which mold release processing is carried out, a front face beforehand After having applied so that the thickness at the time of desiccation might be set to 40 micrometers by the bar coating machine, and performing 80 degrees C and deck-watertight-luminaire-ized processing for 30 minutes, the silica was dissolved using lye and the mimeograph printing version ingredient layer 20 of 38 micrometers of thickness was formed. After an appropriate time, the mimeograph printing version ingredient layer 20 and the substrate were exfoliated, and the mimeograph printing version ingredient layer 20 of a simple substance was obtained. The average opening of the mimeograph printing version ingredient layer 20 was 0.7 micrometers.

[0082] Subsequently, when the version pattern was formed in the mimeograph printing version ingredient layer 20 in the same way as the above-mentioned example 1 and printing to 2000 sheets was performed using the ink constituent 3 among three kinds of ink constituents for ink jets used in the above-mentioned example 1, there is no wear of the film omission of the non-image section or a printing plate, and it was checked that the image section is clear.

[0083] [Example 5] The hot printing medium equipped with the following hot printing ingredient constituent 1 was produced in the following way.

[0084]

The hot printing ingredient constituent 1 EVA410 — The 7.5 weight sections Carnauba wax — The 8.7 weight sections Paraffin wax — The 32.5 weight sections A micro crystallin wax — The 32.5 weight sections Carbon black — On the polyethylene terephthalate (Toray Industries, Inc. make) base material of 4-micrometer thickness, the 3.0 weight sections above-mentioned hot printing ingredient constituent was applied so that the thickness at the time of desiccation might be set to 3 micrometers by the bar coating machine, and it was used as the hot printing medium.

[0085] The version pattern was formed in the following way using this hot printing medium and the mimeograph printing version ingredient layer 20 of the above-mentioned example 1. The front face of the mimeograph printing version ingredient layer 20 and the front face of the hot printing ingredient of a hot printing medium are stuck, and it turns to the mimeograph printing version ingredient layer 20 from the base material side of a hot printing medium. Namely, by semiconductor laser (1W, 780nm) The test pattern was printed, after an appropriate time, the hot printing medium was removed, 80 degrees C and heat treatment for 10 minutes were performed to the mimeograph printing version ingredient layer 20, and the mimeograph printing version was obtained.

[0086] This mimeograph printing version was set to the mimeograph printing machine, and the printing test was actually performed. Consequently, it was checked that it does not have wear of the film omission of the non-image section or a printing plate even if the print durability of the printing version of this invention performs printing of 2700 sheets, and printed matter that each dot size of the image section is uniform and clear is obtained.

[0087] [Example 6] The hot printing medium equipped with the following hot printing ingredient constituent 2 was produced in the following way.

[0088]

Hot printing ingredient constituent 2 Benzyl methacrylate / methacrylic-acid copolymer — 30 weight sections Tetramethylmethane tetraacrylate — 30 weight sections Screw (acryloxyethyl) bisphenol A — 20 weight sections 2, 4, 6-tris (TORIKURORO methyl) 1,3,5-triazine — The 3.6 weight sections p-methoxy phenol — Two weight sections Copper phthalocyanine blue — The 4.2 weight sections above-mentioned constituent was melted to the solvent, on the polyethylene terephthalate (Toray Industries, Inc. make) base material of 4-micrometer thickness, it applied so that the thickness at the time of desiccation might be set to 4 micrometers by the bar coating machine, and it considered as the hot printing medium.

[0089] The version pattern was formed in the following way using this hot printing medium and the mimeograph printing version ingredient layer 20 of the above-mentioned example 2. The front face of the mimeograph printing version ingredient layer 20 and the front face of the hot printing ingredient of a hot printing medium are stuck, and it turns to the mimeograph printing version ingredient layer 20 from the base material side of a hot printing medium.

Namely, by semiconductor laser (1W, 780nm) The test pattern was printed, after an appropriate time, the hot printing medium was removed, UV hardening processing was performed using the high pressure mercury vapor lamp to the mimeograph printing version ingredient layer 20, and the mimeograph printing version was obtained.

[0090] This mimeograph printing version was set to the mimeograph printing machine, and the printing test was actually performed. Consequently, it was checked that it does not have wear of the film omission of the non-image section or a printing plate even if the print durability of the printing version of this invention performs printing of 3800 sheets, and printed matter that each dot size of the image section is uniform and clear is obtained.

[0091] [Example 7] The mimeograph printing version was produced in the way of the above-mentioned example 5 using the mimeograph printing version ingredient layer 20 of the above-mentioned example 3, and the hot printing medium of the above-mentioned example 5.

[0092] When this mimeograph printing version was set to the mimeograph printing machine as it was and printing of 2300 sheets was performed on the usual printing conditions, it was checked that there is no wear of the film omission of the non-image section or a printing plate, and printed matter that each dot size of the image section is uniform and clear is obtained.

[0093] [Example 8] The mimeograph printing version was produced in the way of the above-mentioned example 6 using the mimeograph printing version ingredient layer 20 of the above-mentioned example 4, and the hot printing medium of the above-mentioned example 6.

[0094] When this mimeograph printing version was set to the mimeograph printing machine as it was and printing of 2400 sheets was performed on the usual printing conditions, it was checked that there is no wear of the film omission of the non-image section or a printing plate, and printed matter that each dot size of the image section is uniform and clear is obtained.

[0095]

[Effect of the Invention] Since this invention is constituted like the above, digital platemaking is possible, a development process is not needed, but the effectiveness that the printed matter of high quality can moreover print several many sheets is done so.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the sectional view having shown typically the structure of the mimeograph printing version ingredient layer 20.

[Drawing 2] It is the drawing in which the manufacture approach by the hot printing method of the mimeograph printing version was shown with time.

[Description of Notations]

7 — Hot printing medium

20 — The mimeograph printing version ingredient layer

[Translation done.]

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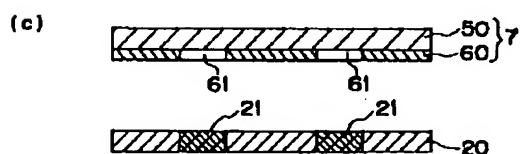
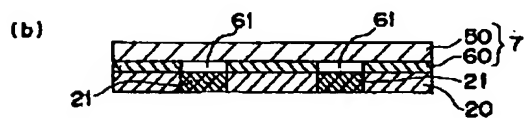
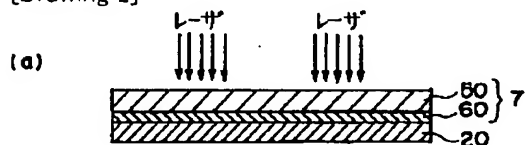
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DRAWINGS

[Drawing 1]



[Drawing 2]



[Translation done.]